PATENT SPECIFICATION

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COMPLETE SPECIFICATION

Improvements in Watch Winding Device

We, CHARLES HILL and CHARLES KERR JOHNS, both citizens of the United States of America, of 1013, Bushwick Avenue, Brooklyn, County of Kings, and 790, Riverside Drive, New York, County of New York, both in the State of New York, United Staes of America, respectively, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to a watch winding device and in particular to one made particularly for use in small watches.

A particular object of the invention is to arrange such a device within the crown of a small watch so that a minimum number of parts will be necessary, these parts may be assembled with ease, and can be properly fitted to the minute structure of fine watches where space is a minimum.

Still further objects of the invention reside in the provision of means for preventing overwinding of a watch spring, strain on the main spring, stripping of the winding gears, the rupture of connected parts within the watch and to provide for the complete housing of said means within the crown which renders the parts dust proof and substantially sealed within the crown without in any way changing the appearance of the watch or necessitating a change in the shape of the crown itself.

Due to the fact that watches for wrist wear, and particularly the type worn by women are of such small dimensions, any conventional declutching member cannot be used to disconnect the winding parts and in the present invention we preset a novel structure that can be placed inside the hollow crown, can employ a friction disk which may be readily dropped in place and secured to the winding member and one which can be adjustably tensioned to do the work involved in watches of various sizes. The invention does not interfere in any way with the mechanism of the watch and prevents the frequent need of vital repairs.

Still further objects of the invention include the reversibility of the parts for use in different watch structures and under different conditions; the use of a plate member within the crown of a thickness determined by the desired tension of the friction disk the shape of which is such that varying degrees of friction surface may be obtained. Further, is the fact that the winding crown and its means of attachment to the winding shaft of the watch may be made as a unit to be fitted to any watch in use, the crown piece being made up separately. By preventing overwinding of the watch spring the teeth in the main spring barrel and in the center wheel are not damaged and breaking loose of the spring from the barrel is guarded against.

With these and other objects in view, the invention comprises certain constructions hereinafter described and then particularly pointed out in the claims, and preferred embodiments of our invention is illustrated in the accompanying drawing, in which:

Figure 1 is a side view of a crown winding device partly shown in section.

Figure 2 is a view of a modification of the crown of Figure 1, before assembly.

Figure 3 is a view in section of a crown showing the parts reversed with respect to the crown.

Figure 4 is a section on the line 4—4 of Figure 3.

Figure 5 is a view of a crown in section showing a modified form.

Figure 6 is a section on the line 6—6 of Fig. 5.

Figure 7 is a diagrammatic view of part of a friction disk.

Figure 8 is a plan view of another form

[*Price* 1/-]

of the invention, and

Figure 9 is a view in sectional elevation of the crown shown in Figure 8.

Referring to the drawing in detail, 10 indicates in outline, the usual winding shaft of a watch, through the medium of which the main spring is wound when the crown piece is rotated, the watch structure forming no part of the present invention except as an illustration of the application thereto of our novel winding crown, which is made as a separate unit to be applied to any make of watch, particularly small wrist watches in which the crown must be made extremely small. The winding crown comprises a stem 11 bored or threaded interiorly or exteriorly at its end 12 to be secured to the upper end of the winding shaft 10 of the watch.

Essentially, our invention involves the use of driving and driven elements so arranged within the crown cap that they may be inserted in two different ways, one of which is illustrated in Figure 1. This method involves drilling a hole in the crown piece, but the preferred form eliminates the use, or rather the necessity of drilling this hole, it being understood that when our device is applied to very small watches, the problem of assembling the parts and drilling, that would weaken them, must be dispensed with. The form of the invention shown in Figures 1 and 2 is to illustrate the possibility of reversed construction. Referring now to Figure 1 the stem 11 is provided with an integral driven plate 13 having either a single or a number of studs 14 projecting from the upper face thereof for engagement with the holes 15 in a spring tension disk 16 which holes may be in the nature of conical depressions or blank holes if desired. As shown in Figure 2, the holes or depressions 17 may be in the upper face of the driven plate 18 for engagement by the conical projections that are formed adjacent the periphery of the spring tension disk 19 as at 20.

The parts are housed within the crown 22 which is open at the top and presents an annular shoulder or ledge 23 bordering said opening, which shoulder forms a support for the driving plate 24 which seats on the shoulder and is secured thereto by the peening or burnishing over of the rim edge or flange 25. The opposite side of the crown 22 is provided with a central opening through which the stem 11 depends to be attached to the winding shaft 10. The outer surface of the crown is knurled as at 26 to give the usual finger grip for winding. Referring to figure 2, when the driving plate 24 is seated on the shoulder 23 and held in place as shown in figure 1, it tensions the disk 19, to which it is attached as by the rivet 27, so that peripheral friction areas 30 of the spring tension disk will turn the driven plate 18 to wind the spring of the watch until such time as the wound resistance of the watch spring is greater than the tractive effort exerted by the disk on the plate 18, at which time relative slippage between the disk and the plate will occur and an audible warning will be sounded by the clicking action of the projections and depressions.

The spring tension disk 19 may be circularly domed as at 31 in Figure 6 or may be diametrically ridged as at 32 in Figure 4, for all the forms of the invention. The friction area as illustrated in Figure 7 diagrammatically, may vary in accordance with the pressure placed on the disk. The tension or temper of the disk is such that while the friction area may have a width A under one condition, it will be increased to provide a greater area B if pressed down the amount B^1. The difference in the friction driving force can be varied by adjusting the thickness of the driven plate.

In Figures 3 and 4, the crown 35 is closed on top as at 36 and open at the bottom. The crown is closed by a keeper plate 37 which is force fitted or otherwise secured in place on an annular seat 38 formed in the open bottom side of the crown 35. The keeper plate is provided with a central opening 39 through which extends the stem 40 of the driven plate 41, the latter co-acting with a friction disk 42 which is secured to the closed top 36 of the crown by the headed end of a rivet projection 43 formed integrally with the crown 35. The cooperating projections 44 of the disk and seats 45 of the plate provide the warning click when the watch spring is wound. While the warning is audible, sensitive fingers can feel the clicking action of the parts, through the gripping contact of the fingers on the crown. The crown 35 is the driving element in this form of the invention or rather it actuates the friction disk directly and not through any intermediate plate member, and does not have an extra drilled hole for the passage of the stem 40.

In the form shown in Figures 5 and 6, the crown, closed on top and open at the bottom, is diametrically fluted as at 48 in its inner wall so that the flutes extend vertically of the crown 47 and are arranged to receive loosely the peripheral tabs 48A of the friction disk 50, which in assembly of the parts is simply dropped into the inverted crown and held in posi-

tion by the driven plate portion 51 of the stem 52 which extends through an opening 53 in the keeper plate 54 which closes the bottom open side of the crown and which is force fitted or otherwise secured in position.

In the form of the invention as shown in Figures 8 and 9, the crown 60 has a central opening in the bottom thereof as at 61 through which extends the stem 62 of the driven plate 63, which rests in the bottom of the crown and presents opposite flat portions or edges 64 and opposite arcuate edges 65 for engagement with a substantially circular shaped spring 66 of spring wire whose ends are held in suitable openings 67 of the side wall of the crown, so that in winding up the spring of the watch, the parts will have the positions shown in full lines in Figure 8, but when the watch spring is fully wound, the resistance thereof will cause the yield of the spring 66 to permit a stationary position of the plate 63 as illustrated in outline at 68, while the winding movements of the crown and spring continue as permitted by the slight distortion of the spring 66. The plate 63 is held in position against the bottom of the crown by a keeper plate 69 whose bevelled edge 70 is engaged by the peened over rim of the crown as at 71 to hold the keeper plate on the shoulder 72 provided therefor in the upper edge of the crown. In this form of the invention, the parts may be reversed to occupy the same relative positions that the parts occupy in Figure 3, that is with the crown inverted and closed at the top and the keeper plate 69 provided with a hole to permit passage of the stem 62. The crown is in the shape of a hollow cup, and when the closure plate is put on the crown it places the disk under tension.

It is evident therefore that we have provided a winding crown construction that may be built into watches during their manufacture or may be manufactured as separate units for fitting or replacement on any make of watch.

Our invention is not to be restricted to the precise details of construction shown since various changes and modifications may be made therein without departing from the scope of the invention or sacrficing the advantages derived from its use.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. A watch winding device comprising in combination with the crown forming a driving element, a driven member having a stem for attachment to the winding shaft of the watch, and a friction member in driving relation with the crown and in frictional engagement with the driven member, both of said members being housed in the crown.

2. A watch winding device according to claim 1, wherein the friction member consists of a relatively thin flexible disk secured to rotate with the crown, said disk being arched and having peripheral friction areas pressed into yieldable tractive engagement with the driven member.

3. A watch winding device according to claim 1, wherein the crown is in the form of a cup having the cup opening closed by a plate holding the friction member and the driven member in driving engagment.

4. A watch winding device according to claim 3, wherein the crown is in the form of an inverted cup, the cup opening at the bottom of the crown being closed by a keeper plate having an opening for the passage of the stem of the driven member resting on said plate.

5. A watch winding device according to claim 2, wherein the flexible disk and the driven member are provided in the zone of frictional engagement with cooperating projection and seat portions producing a signal upon engagement.

6. A watch winding device according to claim 2, wherein the flexible disk is provided with tabs which project into flutes in the side wall of the crown to establish driving engagement therewith.

7. A watch winding device according to claims 2 and 3, wherein the thin flexible disk is secured to the plate closing the cup opening at the top of the crown and adapted to rotate therewith.

8. A watch winding device according to claim 1, wherein the driven member has opposite flat edges and opposite arcuate edges, and the friction member consists or a spring wire encircling said edge portions and having its ends connected with the crown.

Dated this 21st day of November, 1945.

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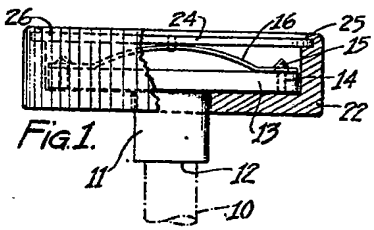

Fig. 1.

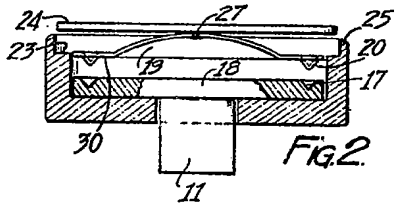

Fig. 2.

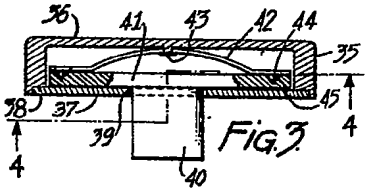

Fig. 3.

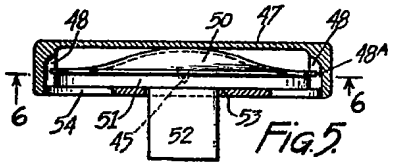

Fig. 5.

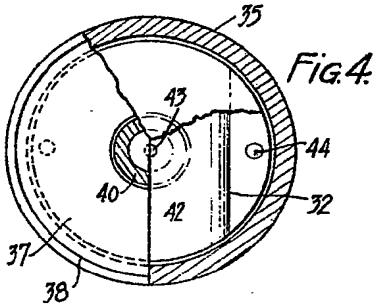

Fig. 4.

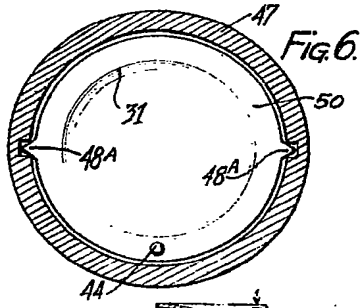

Fig. 6.

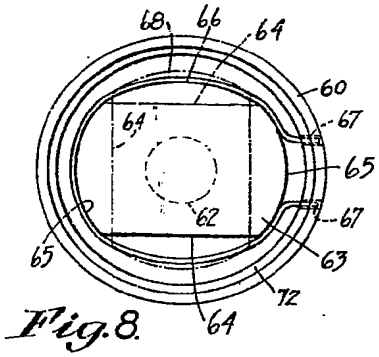

Fig. 8.

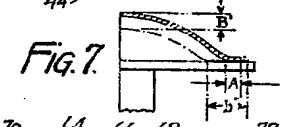

Fig. 7.

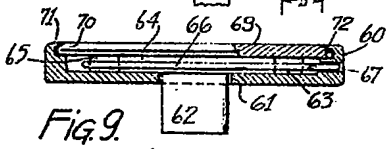

Fig. 9.

H.M.S.O. (Ty. P.)